Indian Streams Research Journal
Vol - I , ISSUE - V [August 2011] : Liberary Science **ISSN:-2230-7850**

Article : Websites of Directorate of Higher Education in India: An Evaluation

Author : A J Dhembare, A B Gholap and B K Uphade [P V P College, Pravaranagar]

ABSTRACT

The objective of the present study was to evaluate the effect of potassium dihydrogen orthophosphate on blood biochemical profile in male European rabbit. During this work alterations in protein, glycogen, calcium, cholesterol, creatinine and bilirubin were assessed by employing standard methods in 2010. The protein, glycogen, calcium and creatinine contents decline while cholesterol and bilirubin raise compare to control. The result suggests changes in blood biochemical constituents due to KH_2PO_4 toxicity in rat and adverse effect are discussed.

Key words: Blood biochemicals, alterations, potassium dihydrogen orthophosphate, rabbit.

INTRODOCTION

Biochemicals are the most important constituents of cells. It has been an important diagnostic tool in health science, indicator of diseases and toxicant tresses in living organisms. Proteins are building blocks of living organism and important in transport, tissue repair and growth, formation of immunoglobin, maintain of blood pH and somatic pressure and coagulation factors. It is also useful to diagnose myeloma, collagen vascular diseases, arthritis, hepatitis, narcosis and thyroid activities (Sharma et al. 2009). Glycogen with protein and lipid contributes to the structure, function of all tissue and involved in cellular organization. It gives fuel and supply major energy

requirement in living cell (Ramkrishnana, 1980). Calcium is necessary for signal transduction pathways, neurotransmitter, muscle contraction, fertilization, blood clotting and in bone formation. Bilirubin is heme catabolism, urobilin and causes jaundice. Creatinine is product of phosphate in muscle; ketoacides, cimentidine and trimethoprimn reduce tubular secretion (Guyton and Hall, 1996).

Potassium dihydrogen orthophosphate (KH_2PO_4) is inorganic substance widely used in additives in food, rubber, pharmaceuticals, food packaging, lubricants, paint and coating, paper and pulp industries, dilatants, fragrant and favors. KH_2PO_4 used indiscriminately and causes health hazards such as diarrhea, nausea, vomiting, cramps, slow heartbeat, accelerate breathing, muscle weakness and paralysis. Eye may cause mild irritation, irritation to nose and throat, coughing-chocking, and skin dermatitis. Due to toxicity normal function of cell is disturbed and causes alteration in physiological and biochemical mechanisms in animals (Sin et al. 1990: Maheswari et al. 1991) and impairment of tissue (Kumaragura, 1995). However, indiscriminate use of KH_2PO_4 gives raises health problems. The present communication was undertaken to study the blood biochemical changes due to KH_2PO_4 on male rabbit.

MATERIALS AND METHODS

Experimental animals: Healthy male European rabbit, O. cuniculus were brought from Reena Rabbitory, Rahata. The equal size and weight (2.1 ± 0.1 kg) were maintained in well ventilation animal cage (55 cm L x 45 cm W x 30 cm H) with a constant 12 hours light and dark schedules. They were feed regularly with fresh vegetables 200 gm three times per day. They were grouped in to two. The control group provided water and food, while treatment rabbit provided a dose at 8 mg/kg body weight according to Ramalingam et al. (2000). The post treatment followed up to 28 day.

Experimental treatment: A chemical Potassium Dihydrogen Orthophosphate (KH_2PO_4) was brought from Vijay Trading Co. Shrirampur. For the treatment target

chemical was dissolved in 2 ml distilled water. An acute oral dose was performed according to the Office of Prevention, Pesticide and Toxic Substances (OPPTS) guidelines following the limit test procedure. Animals were fasted over night prior to experimentation.

Biochemical analysis: Blood sample was collected from caudal vein using heparinzed syringes (5.000 UI) in sterilized vial. Samples were collected on 7, 14, 21 and 28 days. The following blood biochemical parameters were studied in treated and control animals. The serum protein was estimated by biurate method of Lubram (1978), cholesterol by $FeCl_3$-H_2SO_4 method of Zlatkis et al. (1953) calcium by titrimetric method of Oser (1957), bilirubin by p-benzene diazonium sulphonate method and creatinine by p-benzene diazonium sulphonate method of Blum et al. (1985) and glucose by glucose oxidase method of Somogyi (1945).

RESULTS AND DISCUSSION

Table 1 shows the effect of potassium dihydrogen orthophosphate toxicity on blood biochemical parameters such as protein, glucose, cholesterol, calcium, creatinine and bilirubin in rabbit exposed to KH_2PO_4 and presented in Table 1. It revealed that protein, glycogen, calcium, and creatinine contents were depleted while cholesterol and bilirubin were raised in the exposed period. The values varied constituents to constituents and duration.

Protein: Protein in male rabbit were less in the 7^{th} day onward treatment with control showing high value. There was a fluctuation of values, the increase values was noticed at onward in treatments. A high blood protein level has been linked to certain bone marrow diseases (Genton, et al. 2010). In the present study, a reduction in serum total protein after oral administration of KH_2PO_4 to rabbit has been observed. It may lead in to decrease in the number of m-RNA and their attachment to the ribosome and thus depletion in protein. An increase in human has reported due to polyherbal

formation gerriforte during by increasing RNA synthesis (Ganeriwal et al. 1981) in rat. After oral administration, it may be direct anabolic action with nitrogen balance (Kothari and Rathore, 1976: Sharma et al. 2009).

Glucose: The level of glucose did not remain constant during the study periods such an observation was also made in control rabbit. As far as the blood of male rabbit was concerned the glucose level increased from7 day to 28 day. Such a fluction was uniform in the present study. However, the increase in the level of glucose was proportional to the period of exposure in the bug the pesticide Dimilin studied by Raja et al. (2001). In diabetes mellitus, treatment aims at maintaining blood glucose at a level as close to normal as possible, in order to avoid these serious long-term complications.

Cholesterol: An approach to value of cholesterol made showed that KH_2PO_4 are toxic to blood cholesterol contents. Observations were made on cholesterol contents also indicated that KH_2PO_4 is affecting the cholesterol content in blood. Serum cholesterol is found to be higher in the treated animals as compared to control. However, the treated group led with diet coupled with toxic binder showed level never to control values. Abdel-Wahhab (2003) also observed an increased in the serum cholesterol level following aflatoxin exposure (87 mg/kg body wt) in rat. Contrarily, Panda et al. (1987) and Kumar et al. (1993) reported a marked reduction in cholesterol level of Japanese quails and boiler chicken respectively, consequent to dietary aflatoxin even at comparatively low level. The increase in level of serum cholesterol in the present study indicated degenerative changes and hypofunction of liver. Similar findings reported by Kungmapriya et al. (2009).

Calcium: An increase was observed in calcium after one-week exposure to KH_2PO_4. It showed 16.2 % decrease at 7^{th} day and gain on 14 days onward. Premature aging, fatigue, depression and some other conditions may be attributed to excess calcium

levels in the body but this condition has no symptoms. If symptoms do occur with a calcium overdose, they may include fatigue, a change in urination habits, constipation, kidney stones, vomiting, bone pain, confusion, anorexia, or depression. In rare cases, extreme calcium overdoses can be life-threatening, causing coma or cardiac arrests. A calcium overdoses are caused by an excess consumption of calcium supplements. However, hypocalcaemia is often indicative of another disease which include primary hyperparathyroidism, hypervitaminosis-D, parathyroid carcinoma, Paget's disease of the bone (Fraser, 2009).

Creatinine: An increase was reveled in creatinine after exposure to KH_2PO_4. The level of creatinine after one-week exposure showed decreased up to 30.0% on 7^{th} day and decreased onward. Chronic kidney disease may be lead when it showed one of its recognized complications such as cardiovascular disease, anemia or pericarditis (National Kidney Foundation, 2002). Chronic kidney disease, which is identified by a blood test for creatinine. Higher levels of creatinine indicate a falling glomerular filtration rate and as a result a decreased capability of the kidneys to excrete waste products (Adrogue and Madias, 1981).

Bilirubin: Overall increase was noticed in bilirubin after exposure to KH_2PO_4 as compared to control. The level of bilirubin after one-week exposure showed raised up to 5% in 7^{th} day and 30% on 28^{th} day Although Gilbert's syndrome and Crigler-Najjar syndrome are characterized by increased bilirubin in the serum. The bilirubin in these inherited disorders is non-conjugated and thus not excreted in the urine.

From the result we concluded that blood-biochemical parameters are altered due to the KH_2PO_4 toxicity, so avoid it, find out alternative sources, or reduce the toxicity.

REFERENCES

Abdel-Wahaab M A (2003) Antioxident and radical scavenging effects of garlic, cabbage and onion extract in rat fed aflatoxin contaminated diet. J. Agric. Food Chem. 51: 2409-2414.

Adrogue H J and Madias N E (1981) Changes in plasma potassium concentration during acute acid-base disturbances. Am. J. Med. 71: 456-457.

Blum D C, Canaon S and Winketman J W (1985) Clinical Chemistry 2nd Ed. Harper and Row Publication. pp:1050.

Fraser W D (2009) Hyperparathyroidism. Lancet 374 :145-158.

Ganeriwal S K, Reddy B V and Kher J R (1981) Effect of gaerritorte on blood chemistry. Ind. Pract. 3: 1-4.

Genton L, Melzer K and Pichard C (2010) Energy and micronutrients for physical fitness in exercising subjects. Clin. Nutri. 29:413-423.

George R, Kanppe G, Geri H, Venze M and Stahl F (1999) Diagnosis of Cushing's Syndrome: Reevaluation of midnight plasma cortisol, urinary free cortisol and low-dose dexamethasone suppression test in a large patient group. J. Endocrino. Investi. 22: 241-245.

Guyton A C and Hall J E (1996) Text Book of Medical Physiology 9th Ed. A Harcourt Publishers International Comp, Singapor pp:1070.

Kothari L K and Rathore A S (1976) Studies on Gaerriforte : Biochemical changes in rat. Prtobe 3:1-4.

Kumar A, Chandra S K, Rao A T, Bisoni P M and Mishra P J (1993) Clinico-pathological changes in experimental aflatoxicosis in quail. Indian J. Poultry Sci. 28: 150-153.

Kumaragura A K (1995) Water pollution and fisheries. Ecol. Environ. Cons. 1:143-150.

Kungmapriya R, Ravthi K and Balachandaran (2009) Effect of aflatoxin and toxin binders on the serum cholesterol level of breeding Japanese quail, Coturnix coturnux Japonica. J. Exp. Zool. India 12: 223-224.

Lubram M M (1978) The measurement of total serum protein by biurate methods. Ann. Clin. Lab. Sci. 8: 106-110.

Maheswari Devi K, Gopal V and Gopal R (1991) Liver somatic index of C. striatus as a biomonitoring tools, heavy metals and pesticides toxicity. J. Ecotoxicol. Environ. Monit. 1:25-27.

Osar B L (1965) Hawk's Practical Physiological Chemistry, Ed. McGrow-Hill NY 14th Ed pp:1214.

Panda B K, Praharaj N K, Johri T S and Sha R L (1987) Experimental aflatoxin in Japanese quail, evidence of some biochemical changes. Indian J. Poulty Sci. 22: 359=362.

Raja N, Ignacimuthu S and Venkatesan P (2001) Effect of pesticides on biochemical components of the water bug, Diplonychus rusticus (Feb.) (=indicus Venk & Rao) (Heteroptera: Belostomatidae)– A potential predator of mosquito larva. J. Exp. Zool. India 4: 203-210.

Ramkrishnan S (1980) Text Book of Medical Biochemistry. Orient Ongman, Madras. pp:235268.

Ramlingam V, Pannerdos S, Girija M and Ilango S (2008) Mercury chloride induced changes in the histology of the testis and serum testosterone in adult albino rat. Poll. Res. 20: 439-442.

Sharma M K, Singh P K, Gupta A K and Vajpeyi A P (2009) Beneficial impact of Tinospro cordifolia extract on serum protein profile in Albino rat. J. Exp. Zool. India 12: 57-59.

Sin Y M, Jeh W F, Young M K and Reddy P K (1990) Effect of mercury on glutation and thyroid hormones. Bull. Environ. Contam. Toxicol. 44:616.

Somogyi M (1945) Determination of blood sugar. J. Biol. Chem. 160:69-73.

Zlatkis A, Zak B and Boyle A J. (1953) A new method for the direct determination of serum cholesterol. J. Lab. Clin. Med. 41:486-92.

Table 1. Showing biochemical changes in blood parameters of male rabbit.

Sr N	Parameter	Control	7th day	14th day	21th day	28th day
1	Glucose	78 (100)	61 (- 1.8)	65 (-16.7	70 (-10.3	76 (-2.5)
2	Protein	6.1(100)	5.1 (-16.4	5.3 (-13.	5.4 (-11.4	5.5 (-9.8)
3	Calcium	13 (100)	10.9 (-16.2)	11.5(-11.5)	11.6 (-10.8)	11.7 (-10.0)
4	Creatinine	1.0 (100	0.70 (-30.0)	0.79 (-21.0)	0.85 (-15.0)	0.90 (-10.0)
5	Cholester	16 (100)	15.5 (-3.2	16.4 (2.5	16.9 (5.6)	17.5 (9.4)
6	Bilirubin	0.40 (10	0.42 (5.0)	0.45 (12.5)	0.50 (25.(	0.52 (30.(

All figures are in mg/100 ml.
Figures in parentheses are percent reduction over control.